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WATER RESOURCE DEVELOPMENT IN THE UNITED STATES

STATEMENT

OF

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U.S. ARMY

COMMITTEE ON PUBLIC WORKS

HOUSE OF REPRESENTATIVES

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FOREWORD

The Committee on Public Works held hearings May 12, 13, 14, 21, 26, and 27 on the river and harbor and flood control omnibus bill of 1959. At the opening of the hearings, Brig. Gen. John L. Person, the Assistant Chief of Engineers for Civil Works of the Corps of Engineers, made a comprehensive statement on water resource development which the committee felt was quite impressive. General Person, who has had more than 30 years experience in engineering, covered the historical development of Federal interest in navigation, flood control, and related water resources development.

With respect to the present status of the program of the Corps of Engineers in this field, he demonstrated the value of flood control by citing the fact that in approximately 20 years of national flood control activities the Federal Government has invested some $3 billion in improvements which have prevented flood damages of approximately $9 billion, a return of $3 to the people of the United States for every dollar of investment.

In addition, General Person discussed the problems now being faced by the various agencies, both on a national and on a local level, in meeting the challenge of water resources development, and he discussed the measures being taken not only to meet the present problems but to anticipate those which will arise in the future because of the increasing need of an ever-growing population in relation to a fixed water supply.

It is the committee's view that the statement contains much valuable information and is sufficiently provocative in its discussion of civil works problems to warrant a wider distribution among those interested in the extremely important field of water resources development. The statement follows.

FOREWORD

WATER RESOURCE DEVELOPMENT IN THE UNITED STATES

STATEMENT OF BRIG. GEN. JOHN L. PERSON, ASSISTANT CHIEF OF ENGINEERS FOR CIVIL WORKS, BEFORE THE COMMITTEE ON PUBLIC WORKS, HOUSE OF REPRESENTATIVES, MAY 12, 1959

Mr. Chairman and members of the committee, it is a pleasure, as it has always been, to appear before your committee. This is an especially important occasion to me, since in view of my impending retirement it will probably be my last appearance before your full committee as a representative of the Corps of Engineers. I have, therefore, given considerable thought to the statement which I am about to make.

I know that your purpose is to consider, and possibly report out, another omnibus river and harbor and flood control bill. Since enactment of the last legislation of this kind in July 1958 the Chief of Engineers has recommended a number of new projects or modifications of existing projects. These will be considered in detail and representatives of the corps as well as interested local agencies will be called on to testify concerning them, if past procedures are followed.

I feel, therefore, that rather than discuss these new proposals at this time I can serve you best, and best serve the cause of water resources development, by reviewing the road we have traveled in development of the civil works program, and by presenting to the best of my ability and experience some of the more urgent problems that are developing in the water resources segment of the public works activity, and some thoughts on what may be done about them.

I have had the good fortune to be involved in the planning and construction of civil works improvements for the major part of my 30 years service with the Army. The span of my service, therefore, has covered the period of the greatest expansion of Federal activity in this field, since by far the greatest progress on a nationwide basis has taken place since 1936 when the first general flood control legislation was enacted by Congress.

The roots of this activity, of course, go much deeper into the history of our country—to 1824 in fact, when the first river improvements were authorized by Congress and undertaken by the corps. For almost a century thereafter, the Federal interest and activity in this field was limited largely to improvement of navigation on our rivers and harbors. During the next half century, however, we have witnessed a growing interest in water resources development and an ever-increasing expansion of the Federal participation in this activity.

CIVIL WORKS ACCOMPLISHMENTS

This Federal activity in cooperation with States and local organizations has resulted in accomplishment of a major public works program which has produced large public benefits.

In the field of navigation we have over the years improved some 23,000 miles of waterways which includes some 10,000 miles of channels which provide depths of over 9 feet for modern barge transportation. Traffic on these waterways has increased over the past 30 years from 8 billion ton-miles in 1929 to 115 billion ton-miles in 1957. We have also improved some 500 harbors on the Atlantic, gulf and Pacific coasts, on the Great Lakes, and in Alaska and in the overseas territories.

In the field of flood control we have completed or placed in operation 151 flood control and multiple-purpose reservoirs, and nearly 300 works for local flood protection. We estimate that these have prevented flood damages of over $9 billion to date which is almost three times the cost of the flood control improvements. These works are effective in most of our major river basins and on many smaller rivers and streams. The degree of protection varies however, and is far from complete in many areas.

The large multiple-purpose projects, 32 in number, which have been constructed produce a variety of benefits. Over 6 million kilowatts of power have been installed. During 1958 these projects produced 27 billion kilowatt-hours of power or about 20 percent of all the hydropower generated in the United States. The increasing importance of these multiple-purpose and flood control reservoirs for water supply is shown by the fact that at 18 completed projects we have more than 1,200,000 acre-feet under contract for municipal and industrial water supply; and releases of water for irrigation totaled 1,600,000 acre-feet in 1958. These reservoirs, and others where conservation pools are provided, have developed into a major recreational resource. They make available about 3 million acres of water area at normal pool levels. In 1958 attendance at these projects totaled 95 million visitor-days, which is more than double the attendance 5 years ago.

I have for distribution to you a statistical summary of these accomplishments which you may find of interest.

There are a number of salient factors which have contributed to and have been an essential part of this growth, and all of these have involved the deliberations and actions of this committee.

DEVELOPMENT OF WATER RESOURCES LAW

Of primary importance has been the gradual evolution of a great mass of Federal legislation dealing with water resources. The Federal activity in flood control was extended beyond the alluvial valley of the Mississippi for the first time in 1893 when Congress established the California Debris Commission. The act of March 3, 1909, provided for inclusion of data on development and use of waterpower in reports to the Congress. The act of March 4, 1913, provided a legislative basis for reports to Congress on water projects and first required consideration of related water uses on a comprehensive basis. The act of March 1, 1917, authorized flood control construction in California and in the alluvial valley of the Mississippi and made river and harbor laws applicable to flood control. The act of June 5, 1920, required the Chief of Engineers to recommend local cooperation for special benefits that would accrue from projects.

The River and Harbor Acts of 1925 and 1927 authorized the so-called 308 surveys, which were the first attempt to appraise the resources and problems of all the rivers of the United States. These

were largely completed by the corps during the ensuing decade. These studies provided a basis for much work undertaken for relief of unemployment during the early 1930's, were a basis for the TVA plan of development, and for improvements authorized by subsequent flood control acts. The act of May 15, 1927, authorized the present major project for control of floods in the alluvial valley of the Mississippi.

Perhaps the most significant piece of legislation, however, was the act of June 22, 1936, which established for the first time a national policy for Federal participation in flood control on a nationwide basis. That act has been amended and extended by omnibus river and harbor legislation in 1938, 1941, 1944, 1946, 1950, 1954 and 1958. While all of these acts authorized specific projects they also included important general legislation which has expanded and clarified the Federal interest in almost every phase of water resource development, including:

Provisions to preserve for future use the hydroelectric power potential of projects.

Recognition of rights and interests of States.

Coordination with other Federal agencies such as the Departments of Interior and Agriculture.

Recognition of major drainage as a part of flood control.

Provision of facilities for access and public use, for recreation and conservation of fish and wildlife.

Provision for disposal of hydroelectric power by the Secretary of the Interior.

Provision for planning for municipal and industrial water supply and for its disposal.

Recognition of recreational navigation.

Authority for accomplishment of flood fighting, emergency work and small justified projects.

In addition there have been related acts which have clarified the Federal interest in such matters as control of beach erosion; protection against flooding by hurricanes in coastal areas; and increased recognition of fish and wildlife preservation as a project purpose.

We are often inclined to think of these laws in their narrower sense of providing a vehicle for authorization of specific projects. And we still use the terminology of flood control law or river and harbor law.

The fact that these same acts provide the present broad basis for Federal participation in almost every phase of water resources development is seldom recognized. It would be much more accurate to characterize these acts as Federal water resources law. I believe they should be dignified by a greater recognition of their real import.

This body of law has developed in a gradual and practical way to meet needs as they have arisen. One result of this procedure, and the broad program that has developed, has been stimulation of wide interest in water resources development. As a result this subject has been studied by numerous commissions and committees of the legislative and executive branch. These studies have led to legislative proposals, generally broad in scope. Some of these proposals have never reached the Congress, while some bills of this kind are now before the Congress for consideration. Many have merit, but most proposals of this kind cover so many aspects of the problem that they unavoidably attract strong opposition as well as support. It seems to me that the experience of this committee over the years

affords a valuable lesson—that development of water resources legislation is a matter of evolution, a step-by-step process, based on practical needs and experience.

MULTIPLE-PURPOSE DEVELOPMENT AND PLANNING

Perhaps the most significant change that has grown out of this expanded Federal interest in water resources has been the shift in emphasis from single-purpose to multiple-purpose development; and from planning for some particular project to comprehensive and coordinated river basin planning.

As our country has grown and developed during the past half century, and particularly during the past decade of almost explosive growth in population and industry, it has become apparent that our rivers must be developed to meet all present needs and to serve as fully as possible the needs of the foreseeable future.

I think the Corps of Engineers has felt the impact of this change more than any other Federal agency. Thirty years ago, when the Congress authorized the corps to make a study—even such a broad study of many rivers as the 308 surveys—it was possible for us to proceed almost unilaterally. There were so many obvious needs for navigation and flood control projects that selection and recommendation of individual worthwhile projects was a relatively simple task.

Those days have gone forever. The rising interest in water resources development is now shared by many Federal agencies, by the States to an increasing degree, and by industry and organizations of private citizens. Many of these have broad interests while others tend to support some particular phase or interest, to the exclusion of all others. And the inherent conflicts in use of water have been intensified by increasing demands upon a limited supply.

The pattern of study, therefore, that has emerged is one of comprehensive river basin studies in which other Federal agencies, the States and private organizations all cooperate in their respective fields of interest. Such studies are now underway in the Delaware and Potomac River Basins; and our review of the plan for the Columbia River Basin, which will soon be submitted to the Congress was also made on that basis.

This is a sound development as it insures that the skills and information available to the agencies and States are brought to bear on solution of these complex water problems. It does, however, require patient and difficult coordination and efforts to resolve conflicting interests. It also involves consideration of many phases of river basin development which are emerging as of major importance and as difficult problems. Thus comprehensive and multiple-purpose planning is not an easy task, but I believe we are making progress.

We have given much attention to the requirements of coordination. I appeared recently before your Subcommittee on Watershed Development and described the relationship between our flood control program and the flood prevention program being developed by the Department of Agriculture under Public Law 566. At that time I told you that we have a working task group composed of representatives of the SCS and corps who are attempting to resolve differences and achieve coordination and uniformity in conduct of these programs. In January of this year we were able to complete a memorandum of

agreement covering, at least in part, the participation by the two agencies in urban flood protection.

Enactment of the Water Supply Act of 1958 in July of last year has led us to seek and reach an agreement with the Department of Health, Education, and Welfare. This will further implement our past close relations with the Public Health Service in the field of water supply investigations. We desire and have been promised their assistance in appraising needs for water supply and in evaluating it. This would be somewhat analogous to the manner in which the Federal Power Commission now assists us in estimating power needs and in evaluating hydroelectric power.

In addition we are continuing our efforts in working with the Interagency Committee on Water Resources, and through informal interagency committees, to arrive at uniform and mutually acceptable procedures for project evaluation, cost allocation and cost sharing.

One of the most important and productive areas of coordination is that which involves the States. As you know the 1944 Flood Control Act specifically requires coordination with affected States in our planning. Experience has shown us that progress is greatly facilitated when there is a strong State interest in conservation and use of its waters. In particular we have found that much can be accomplished when there are strong State organizations with which we can deal during the entire planning and construction procedure. In addition many States, particularly those in the more humid parts of the country, are showing an increasing interest in clarifying their own water laws. We are trying to encourage more positive and effective State participation in civil works.

NEW WATER RESOURCES PROBLEMS

In addition to the problems of agency and State coordination we are confronted with many new problems of river development. These have received some consideration in the past—but largely as incidental to the matters in which there has been an accepted Federal interest. Now, however, such matters as regulation of flow for water supply and other purposes, abatement of pollution, preservation and enhancement of fish and wildlife, regulation of flood plain use, and recreation are pressing for recognition as important problems and purposes of river basin development.

For many years we have recognized the need for regulation of the high flows of rivers—or control of floods. The economic drain upon our resources imposed by recurring flood losses was obvious. Somewhat less obvious 20 years ago was the need for regulation of rivers for all purposes. This need, however, has now been made plain by the recent succession of drought years in the Southwest, by the crowding of industry to river banks in search of water and economic bulk transportation, and by the increasing pollution of our rivers. I predict that as time goes on the regulation and improvement of low water discharges of our rivers may become even more important than regulation of floodflows. This is merely a part of the multiple-purpose concept under which we hold that our rivers must be developed for all purposes.

Conservation interests throughout the country have for many years been intensely interested in preservation of fish and wildlife values in

connection with water resources development. In the past, however, their approach has been somewhat negative—largely opposition to river development and at best an insistence that loss and damage be prevented. The new Fish and Wildlife Coordination Act provides a more positive approach which we welcome. It gives greater stature to fish and wildlife as a project purpose and recognizes the possibility of enhancement of benefits as well as mitigation of losses. We are extremely anxious to establish a working relationship under which the fish and wildlife resource can be evaluated and provided for as one of the real purposes of water resources projects. To this end conservationists and engineers must learn to talk the same language to work out mutual problems.

It is becoming increasingly apparent that river valleys will be developed and used regardless of the flood hazard. The economic advantages of valley lands are so great that this growth seems inevitable. While we have made great progress in providing flood control works, many of our river valleys are still subject to desctructive floods, and the degree of protection varies widely. Moreover, it will probably not be possible, because of physical and economic limitations, to provide full flood protection. This leads to the inescapable conclusion that greater attention must be given by States, municipalities and industry, and by the Federal agencies concerned with development, to some form of regulation of flood plain use. I do not suggest an attempt to prevent any such use, but an intelligent appraisal of the hazards involved when these lands are used. We should be as much concerned with avoidance of creating a future flood hazard as with means of correcting the damage after it occurs.

Another emerging problem or potentiality of river basin development that has been assuming increasing importance is recreation. When most of our flood control and multiple-purpose reservoirs were authorized and built, little if any consideration was given to their recreational potential. Congress, however, in the Flood Control Act of 1944 was farsighted enough to give us rather broad authority to provide facilities for access and public use so that the potential of these projects for recreation and for fish and wildlife could be realized. As a result our records show that in 1958 the recreational use of projects under the jurisdiction of the corps totaled about 95 million visitor-days. This real and tangible value of water resource development can no longer be ignored as a project purpose. It is becoming so important that we must consider and provide for recreational use in project planning.

These are important outstanding problems which confront those who are now engaged in water resources planning. I could name others, but I believe those I have mentioned are sufficient to raise the question as to how we can accomplish the complex coordinated planning that will be necessary if future needs are to be met.

WATER RESOURCE PLANNING

There have been numerous proposals over the years, and experiments, in carrying out water resources planning. These have run the gamut from single-purpose studies by a single agency to the present coordinated studies with full interagency participation. There have been proposals for valley authorities such as the TVA.

More recently the President's Water Resources Policy Commission recommended the establishment of an Executive Review Board and separate river basin commissions, which would coordinate and review the activities of the Federal and State agencies.

During the last session of Congress, two study commissions were authorized one for southeastern rivers and one for the State of Texas. These commissions are now recruiting staffs and building up organizations. The Corps of Engineers is represented on the commissions along with other Federal agencies. We are not yet sure just what the functions and activities of these new organizations will be, but we stand ready to provide all possible assistance. Presumably study commissions of this kind will report to the Congress through this Public Works Committee.

It is obvious therefore that there are a number of ways in which the Federal Government can participate with States and local organizations in water resources planning. We feel confident that regardless of the organizational arrangements that may ultimately evolve, the experience of the Corps of Engineers will be needed and you may be sure that we will cooperate as in the past with whatever organizational arrangements the Congress may establish.

In any event I feel very strongly that in our present and future planning for water resources development we must look forward to future needs, rather than to the past and present. In many river basins the more obviously needed projects have been built, or authorized by Congress for construction. But we know that the flood problem has not been solved and the future demands for water will increase. Our approach must therefore be a broad gage appraisal of how river basins and regions are likely to develop over the next 50 to 100 years and of the resources and developments that will be required to meet those needs. We can then proceed to develop the plans which are feasible to provide the water, power, and flood protection that will be required. Some elements of such plans may not be needed now and may not be justified for some years to come, but framework plans of this kind would enable us to proceed with the works needed under present conditions with assurance that what we do now will fit in with and not preclude the more complete developments that will be essential in the years to come.

In closing, I should like to express my very real appreciation of the friendly and understanding attitude which you have always shown me. It has been a major factor in making my present assignment, which I am shortly to leave, one of the most interesting and satisfying jobs of my career.

CORPS OF ENGINEERS

Civil works program statistics, fiscal year 1958

NAVIGATION

General:	
Improved waterways ..... miles	23, 000
Improved harbors	500
Navigation locks	230
Navigation dams	190
Commerce (1957) ..... billion tons	1. 13
Number of active navigation projects:	
Completed	2, 066
Under construction	207
Balance	177
Estimated cost of active navigation projects:	
Completed	$1, 443, 600, 000
Under construction	$1, 885, 400, 000
Balance	$1, 998, 500, 000
Construction during fiscal year 1958:	
Number of projects on which construction work was performed	123
(Number of which were placed in operation	55)
(Number of which are initiated	23)
Maintenance:	
Maintenance and operation activities were conducted on 266 navigation projects during the fiscal year at a cost of	$76, 900, 000

FLOOD CONTROL

General:	
Reservoirs in operation	117
Local protection projects in operational status	300
Damages prevented since projects were placed in operation	$9, 000, 000, 000
Damages prevented during fiscal year 1958	$296, 000, 000
Number of active flood control projects:	
Completed	365
Under construction	172
Balance	277
Estimated cost of acrive flood projects:	
Completed	$961, 400, 000
Under construction	$2, 759, 100, 000
Balance	$2, 129, 500, 000
Contruction during fiscal year 1958:	
Number of projects on which construction work was performed	104
Number of which were placed in operation	33
Number of which were initiated	14

MULTIPLE-PURPOSE PROJECTS PRODUCING HYDROELECTRIC POWER

General:	
Reservoirs in operation for hydroelectric power	32
Installed capacity of projects producing power kilowatts	6, 000, 000
Generating capacity installed during fiscal year 1958 kilowatts	792, 000
Generating capacity under construction kilowatts	4, 500, 000
Ultimate capacity of projects completed and under construction kilowatts	13, 800, 000
Construction during fiscal year 1958:	
Number of projects on which construction work was performed	23
(Number of which were placed in operation	9)
(Number of which were initiated	0)
Number of active multiple-purpose projects:	
Completed	21
Under construction	26
Balance	13
Estimated cost of multiple-purpose projects:	
Completed	$1, 114, 000, 000
Under construction	$3, 388, 200, 000
Balance	$1, 153, 300, 000

WATER SUPPLY

Of the total flood control and hydropower producing projects, 18 have water supply storage, furnishing approximately 1,200,000 acre-feet of water to about 40 communities.

RECREATION

Of the total flood control, navigation, and hydropower producing projects, 151 have recreational facilities. These facilities have been furnished at an estimated Federal cost of $10,400,000 and a local estimated cost of $136 million. During the year 1958, public use of these facilities reached a total of 95 million visitor-days.

BEACH EROSION CONTROL

Under the beach erosion portion of the navigation program, 68 projects have been authorized by the Congress of which 23 projects have had appropriations for construction. The total estimated Federal cost of these authorized projects is approximately $35 million; of this amount about $6 million has been appropriated to date leaving a balance of $29 million to complete. Initial construction has been substantially completed on about one-third of the projects which have been authorized; another one-third of the authorized projects are partially completed.

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